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PATENTS

Our Ref: 76756

AUSTRALIA  
*Patents Act 1990*  
**PATENT REQUEST: STANDARD PATENT**

We, CONSOLIDATED LEISURE HOLDINGS PTY LTD being the person(s) identified below as the Applicant, request the grant of a standard patent to the person identified below as the Nominated Person, for an invention described in the accompanying complete specification.

Full application details follow.

Applicant and Nominated Person:	CONSOLIDATED LEISURE HOLDINGS PTY LTD A.C.N. 000 792 325
Address:	98 Glebe Point Road, Glebe, New South Wales. 2073
Invention Title:	Effluent scavenging system
Address for Service in Australia:	F B RICE & CO 28A Montague St BALMAIN NSW 2041
Attorney Code: RI	

**ASSOCIATED PROVISIONAL APPLICATION(S) DETAILS**

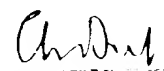
Application Number(s) and Date(s): PO0710: 28 June 1996

Drawing number recommended to accompany the abstract: Fig 1

Dated this twenty-seventh day of June 1997

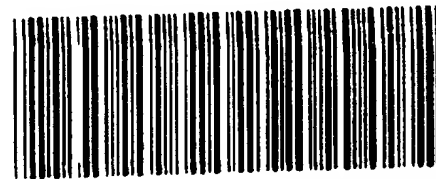
CONSOLIDATED LEISURE HOLDINGS  
PTY LTD

By:

  
CHRIS O'SULLIVAN  
Registered Patent Attorney

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(12) PATENT ABSTRACT (11) Document No. **AU-A-28359/97**  
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(54) Title  
**EFFLUENT SCAVENGING SYSTEM**

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(71) Applicant(s)  
**CONSOLIDATED LEISURE HOLDINGS PTY LTD**

(72) Inventor(s)  
**NAME NOT GIVEN**

(74) Attorney or Agent  
**F B RICE & CO , 28A Montague Street, BALMAIN NSW 2041**

(57)

This invention concerns an effluent scavenging system, that is an adjunct to or a potential replacement for the traditional grease trap. The primary use of the invention is perceived, at this time, to be for the separation of solids and grease (or oil) from waste water. In particular, but not exclusively, embodiments of the invention may be used in the food preparation industry. They may provide an effluent scavenging system comprising a settling chamber having an effluent inlet, an effluent outlet and flow control apparatus between the inlet and outlet. The system also includes a horizontally arranged waste outlet positioned at a level above the height of the outlet.

**AUSTRALIA**  
**Patents Act 1990**

**CONSOLIDATED LEISURE HOLDINGS PTY LTD**

**ORIGINAL**

**COMPLETE SPECIFICATION  
STANDARD PATENT**

*Invention Title:*

*Effluent scavenging system*

The following statement is a full description of this invention including the best method of performing it known to us:-

## Technical Field

This invention concerns an effluent scavenging system, that is an adjunct to or a potential replacement for the traditional grease trap. The primary use of the invention is perceived, at this time, to be for the separation of solids and grease (or oil) from waste water. In particular, but not exclusively, embodiments of the invention may be used in the food preparation industry.

## Background Art

Traditional grease traps contain the waste within a chamber for a long period of time during which natural bacterial activity commences breakdown of the waste. High levels of unpleasant odour arise during the natural breakdown processes, creating an unpleasant and unhygienic environment in the vicinity of the grease trap.

## Disclosure of the Invention

The invention as currently envisaged, provides an effluent scavenging system comprising a settling chamber having an effluent inlet, an effluent outlet and flow control apparatus between the inlet and outlet. The system also includes a horizontally arranged waste outlet positioned at a level above the height of the outlet.

The system is designed with the effluent outlet below the level of the waste outlet so that the ambient level of the effluent in the chamber is below the waste outlet to allow the oil and grease to rise to the surface. The level is then allowed to rise at a rate controlled by the apparatus until effluent flows over the edge of the waste outlet. As flow into the waste outlet commences a rotational action may be initiated which draws the surface layer of the effluent into a whirlpool. The level is allowed to return to ambient as the effluent flows out of the effluent outlet at a rate controlled by the apparatus.

The settling chamber will generally have a capacity two or three times greater than the source of the effluent, which may for instance be a sink. Raw effluent from the sink may be sieved or filtered to remove solid waste. After filtering the effluent may pass through a powder separator before being allowed to enter the settling chamber. If desired, the sieve, filter and powder separator may all be included within the same unit as the settling chamber. Alternatively they may be provided in separate, upstream units, and in some applications will not be required.

The effluent outlet may include a gas trap to arrest the back feed of drain gases. Bacteria may be injected into the effluent as it flows past the outlet to complete the elimination of remaining pollutants in the discharged effluent.

5 The flow control apparatus within the settling chamber may comprise a series of weirs.

A first weir may separate the inlet from the outlet. This weir will generally be a solid partition extending across the width of the settling chamber from the floor to below the ambient water level. The horizontally  
10 arranged waste outlet will also be separated from the inlet by the weir, and an incoming load of effluent will be retained behind the weir, on the inlet side, to settle. After the oil and grease has risen to the surface, a further load of effluent entering the chamber will displace the earlier, settled, load and it will rise up until its surface layer reaches the level of the waste outlet.

15 A second weir may extend across the width of the settling chamber from the floor to just below the level of the waste outlet, between the first weir and the waste outlet. This weir comprises a mainly solid partition but has at least one aperture near the bottom of the chamber to allow flow of effluent past it. The top of the second weir scours the bottom level of the  
20 surface waste of the effluent as it travels towards the waste outlet. In this way the second weir controls the amount of 'clean' effluent that is allowed to enter the waste outlet.

A third weir may extend across the width of the settling chamber from the floor to substantially above the level of the waste outlet, between  
25 the waste outlet and the effluent outlet. This weir also comprises a mainly solid partition with at least one aperture near the bottom to allow flow of effluent past it. This weir controls the rate of flow of effluent into the effluent outlet, and also ensures that only 'clean' effluent from near the bottom of the chamber enters the effluent outlet.

30 The waste outlet may comprise one or more of the horizontally arranged openings. They are connected to pipework that takes the oil and grease to a suitable collector

#### **Brief Description of the Drawings**

35 An example of the invention will now be described with reference to the accompanying drawings, in which:

figure 1 is a pictorial diagram of an effluent scavenging system embodying the invention, with the front of the settling tank removed;

figure 2 is a schematic elevation of the setting tank of figure 1 showing the ambient effluent level; and

figure 3 is a schematic elevation of the setting tank of figure 1 showing the level to which the effluent rises during operation of the system.

The same reference numerals have been used throughout the drawings to refer to corresponding features.

### **Best Modes for Carrying out the Invention**

The effluent scavenging system 1 comprises three main units: a filtering unit 2; a settling tank 3; and a dosing unit 4.

The filtering unit 2 has an inlet 5 rising up from its upper surface and connected to the drain of a sink (not drawn to scale). An outlet 7 extends from the lower part of the unit and enters a side wall of the settling tank 3. A fine mesh (not shown) inside the unit interrupts the flow of effluent, in this case water, from the sink to the outlet. The mesh collects solids but allows liquids including oils and grease to pass through. The mesh is connected to a tray 8 that can be withdrawn from the front of the unit for cleaning.

The settling tank 3 receives the outlet 7 from the filtering unit 2 through a side wall 9. A nozzle 10 sprays the incoming water into the tank.

A water outlet, indicated generally at 11, exits the other side wall 12 of the settling tank, and delivers water to a drain (not shown). The water outlet 11 is configured as a gas trap with an opening 13 pointing downward to prevent the backflow of gases from the drain. When the level of water in the tank rises to the level of the upper horizontal part 14 it will be able to flow out of the exit 11. In this way the exit defines the ambient level of water 15 in the tank: shown in figure 2.

A waste outlet 16 is positioned within the settling tank. Outlet 16 has two horizontally arranged openings 17 and 18 just above the ambient level of the water 15. The openings are connected to pipework 19 which exits the front of the tank to deliver the waste to an appropriate receptacle (not shown).

A sludge separator panel 20 extends up from the bottom of sidewall 9 and into the tank. The top of the panel 20 is above the level of the water in the tank. Fingers, one of which is indicated generally at 21, are cut out of the top of panel 20 to allow water to escape from the powder separator 22

defined between the sidewall 9 and the panel 20. Nozzle 10 is arranged to spray incoming water onto the panel 20 creating a vortex which traps suspended powders against the panel. The powders then slide down the panel to form a sludge at the bottom. A valve 23 at the bottom of sidewall 9 is used to periodically remove the sludge.

After the powder separator 22, in the settling chamber, there is a first weir 24. The first weir 24 is a solid partition which extends across the width of the tank to below the ambient water level 15 (shown in figure 2). An incoming load of effluent will be retained behind the weir, on the inlet side 25, to settle.

After the oil and grease has risen to the surface, a further load of effluent entering the tank will displace the earlier, settled, load and it will rise up until its surface layer reaches the level 26 (shown in figure 3) of the openings 17 and 18 of the waste outlet 16.

The surface layer will have small wavelets as it rises and these will begin to lap the edges of the openings 17 and 18. Initially the waste will flow over the edges due to the wavelets, but as the flow strengthens it will begin a rotational 'whirlpool' motion that will suck the surface layer of water into the waste outlet. Lower levels of water that rise over weir 24 will flow into a well 27 bounded by first weir 24 and a second weir 28.

The second 28 weir extends across the width of the settling tank from the floor to just below the level of the openings 17 and 18 in the waste outlet 16. This weir comprises a mainly solid partition but has at least one aperture 29 near the bottom of the tank to allow flow of water from well 27 past it. The top of the second weir 28 scours the bottom level of the surface waste of the water as it travels towards the waste outlet 16. In this way the second weir 27 controls the amount of 'clean' effluent that is allowed to enter the waste outlet 16.

A third weir 30 extends across the width of the settling tank from the floor to substantially above the level of the waste outlet 16. Third weir 30 is positioned between the waste outlet 16 and the water outlet 11. This weir also comprises a mainly solid partition with at least one aperture 31 near the bottom to allow flow of water past it. This weir controls the rate of flow of water into the water outlet 11, and also ensures that only 'clean' effluent from near the bottom 32 of the tank enters the water outlet 11.

The sizes of the apertures 29 and 31 in the second and third weirs 28 and 30, control the rate of flow of water through the tank. When the water level in the tank rises, the oil and grease from the surface of the water are sucked into the waste outlet, and the 'clean' water flows out of the water outlet until the water level falls back to ambient 15.

Provided the size of the tank is designed for the expected frequency and volume of water coming in at any one time, the heights of the weirs are appropriately selected, and the apertures are properly sized, the separation tank will function to effectively remove oil and grease from the water.

To ensure that water flowing from the water outlet 11 is clean, it is dosed with bacteria to break down any remaining pollutants. The bacteria are stored in a fluid medium within reservoir 33 of dosing unit 4. The bacteria are pumped out of the reservoir 33 by a pump 34, and down a small tube 35. Tube 35 fits over a spigot 36 in water outlet 11, and a small amount of the bacteria are injected into the water in the outlet.

Although the invention has been described with reference to a particular example it should be appreciated that it could be put into effect in other ways. For instance, the filtering unit and dosing unit could be incorporated into the settling tank. Alternatively they could be comprised in separate units. The settling tank itself could also be arranged differently provided the flow of water through it was properly controlled. For instance the inlet may enter the top of the settling tank. Also, the waste outlet may comprise a horizontally disposed tube having a horizontal opening instead of the two horizontal openings described. In this case the outlet may be positioned on top of one of the weirs, such as the second weir.

It will be appreciated by persons skilled in the art that numerous variations and/or modifications may be made to the invention as shown in the specific embodiments without departing from the spirit or scope of the invention as broadly described. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive.



THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. An effluent scavenging system comprising a settling chamber having an effluent inlet, an effluent outlet, a flow control apparatus between the inlet and outlet, and a horizontally arranged waste outlet positioned at a level  
5 above the height of the outlet: wherein

the ambient level of the effluent in the chamber is below the waste outlet, and in use, as effluent enters the chamber the level is allowed to rise at a rate controlled by the flow control apparatus until effluent flows over the edge of the waste outlet, and then is allowed to return to ambient as the  
10 effluent flows out of the effluent outlet at a rate controlled by the apparatus.

2. An effluent scavenging system according to claim 1, wherein the waste outlet includes a horizontally disposed round opening.

3. An effluent scavenging system according to claims 1 or 2, wherein the system further includes a sieve or filter up stream of the settling chamber  
15 to remove solid waste.

4. An effluent scavenging system according to any preceding claim, wherein the settling tank includes a powder separator immediately in front of the inlet.

5. An effluent scavenging system according to any preceding claim,  
20 wherein the effluent outlet includes a gas trap to arrest the back feed of drain gases.

6. An effluent scavenging system according to any preceding claim, wherein bacteria are injected into the effluent as it flows past the outlet.

7. An effluent scavenging system according to any preceding claim,  
25 wherein the flow control apparatus within the settling chamber comprises a series of weirs.

8. An effluent scavenging system according to claim 7, wherein a first weir separates the inlet from the waste outlet, and the first weir is a generally solid partition extending across the width of the settling chamber from the  
30 floor to below the ambient water level.

9. An effluent scavenging system according to claim 8, wherein a second weir extends across the width of the settling chamber from the floor to just below the level of the waste outlet, between the first weir and the waste outlet, and the second weir comprises a mainly solid partition but has  
35 at least one aperture near the bottom of the chamber to allow flow of effluent past it.

10. An effluent scavenging system according to claims 7, 8 or 9, wherein a third weir extends across the width of the settling chamber from the floor to substantially above the level of the waste outlet, between the waste outlet and the effluent outlet, the third weir comprises a mainly solid partition with at least one aperture near the bottom to allow flow of effluent past it.

11. An effluent scavenging system according to any preceding claim, wherein the waste outlet may comprise one or more of the horizontally arranged openings.

12. A effluent scavenging system substantially as herein before described with reference to the accompanying drawings.

DATED this 27th day of June, 1997

CONSOLIDATED LEISURE  
HOLDINGS PTY LTD.

Patent Attorneys for the Applicant:

F.B. RICE & CO.

### ABSTRACT

This invention concerns an effluent scavenging system, that is an adjunct to or a potential replacement for the traditional grease trap. The primary use of the invention is perceived, at this time, to be for the separation of solids and grease (or oil) from waste water. In particular, but not exclusively, embodiments of the invention may be used in the food preparation industry. They may provide an effluent scavenging system comprising a settling chamber having an effluent inlet, an effluent outlet and flow control apparatus between the inlet and outlet. The system also includes a horizontally arranged waste outlet positioned at a level above the height of the outlet.

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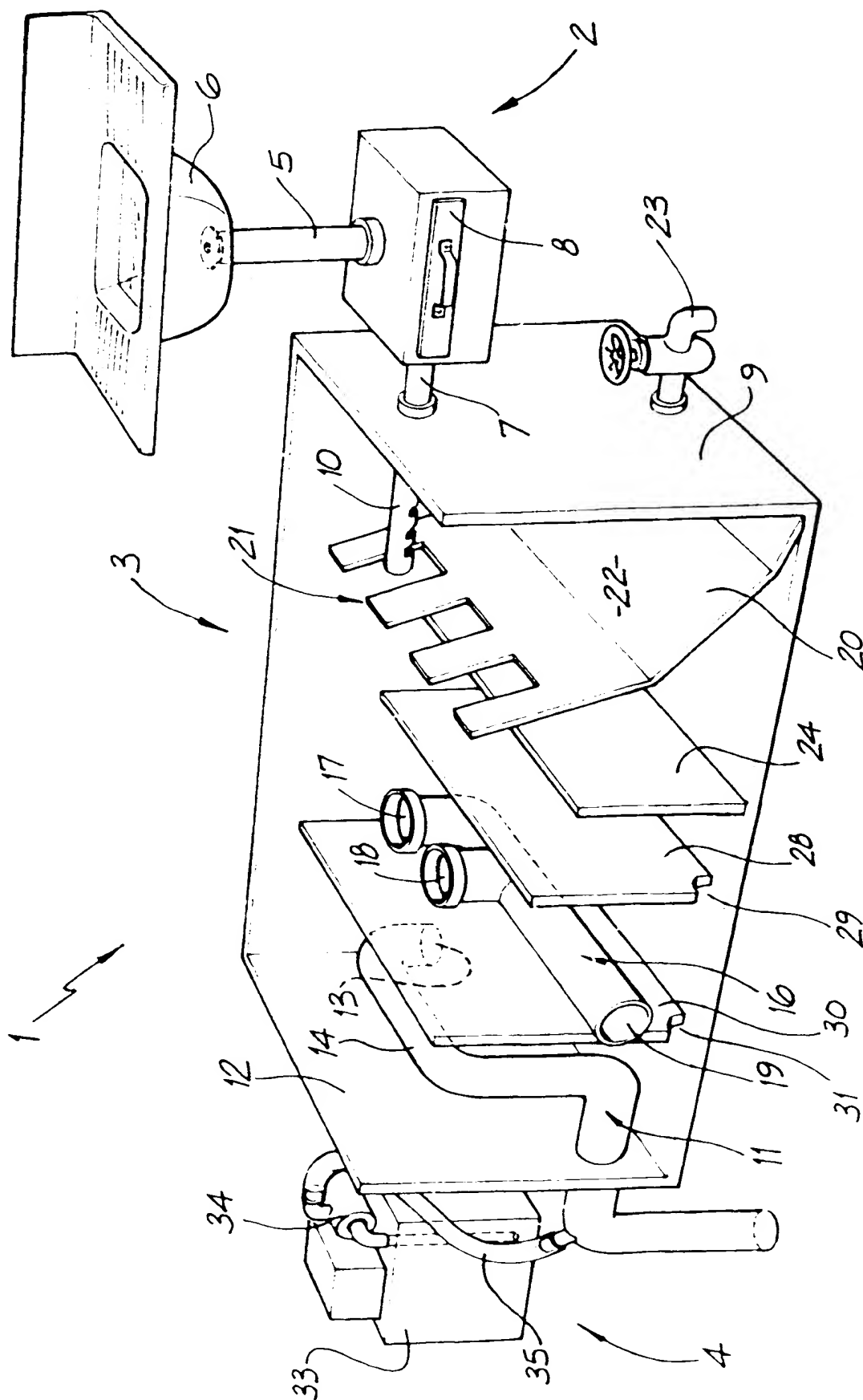


FIG. 1

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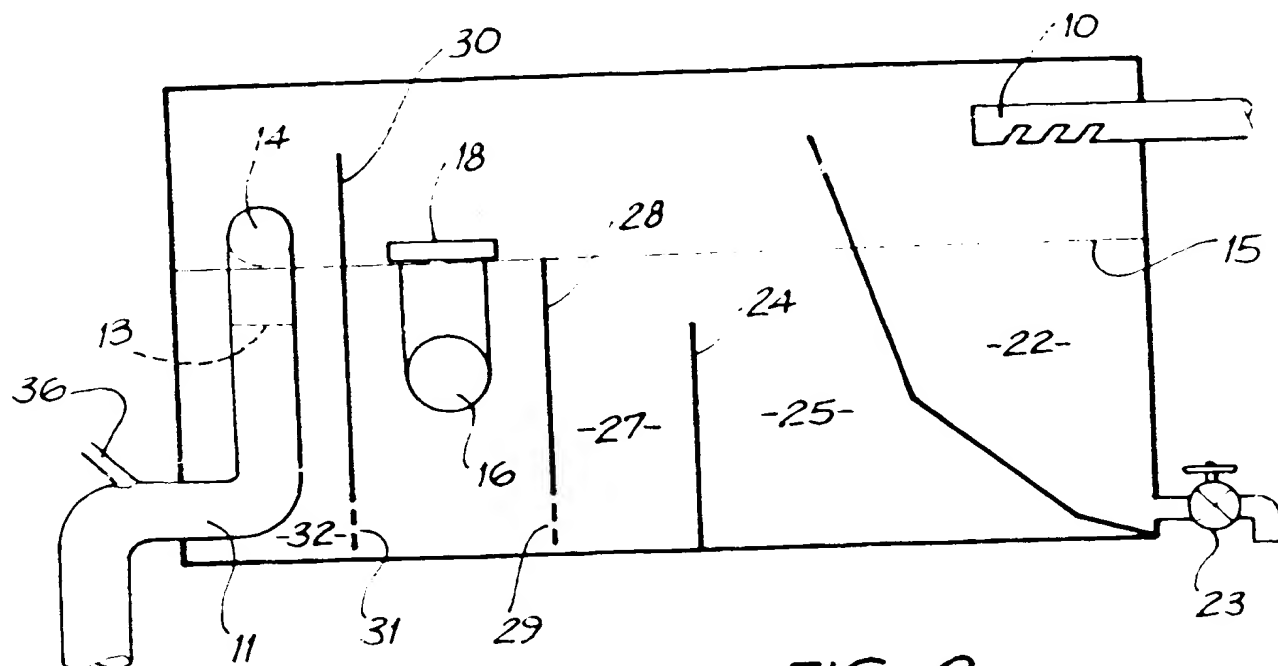


FIG. 2

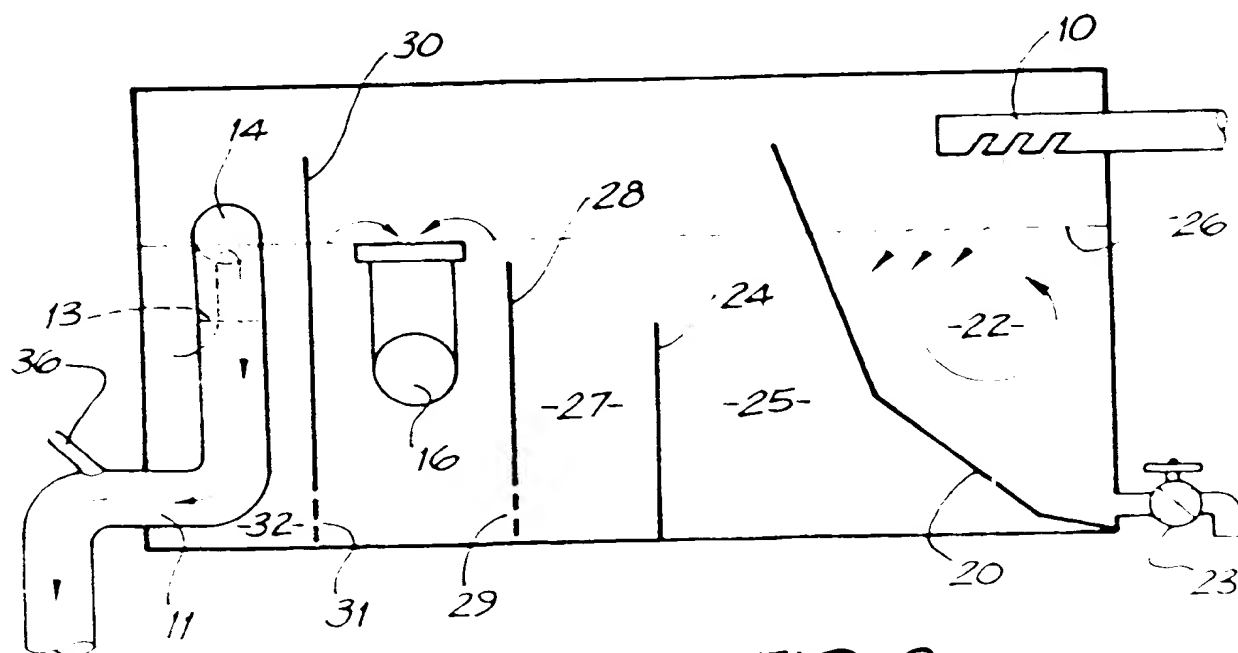


FIG. 3